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(54) Title: ADSORBENTS, METHODS OF PREPARATION, AND METHODS OF USE THEREOF

(57) **Abstract:** Adsorbents and methods of use thereof are provided. One representative, among others, includes an adsorbent having an alkali metal promoted, mixed trivalent layered double hydroxide (LDH) composition. When the mixed trivalent layered double hydroxide (LDH) composition is heated to a temperature ranging from about 300°C to 450°C, an the adsorbent having an adsorption capacity of at least 0.8 millimoles of CO<sub>2</sub> adsorbed per gram of adsorbent is formed.

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